

Two new species of the genus *Ophiuraster* (Ophiurinae, Ophiuroidea, Echinodermata) from French collections and some remarks on the genus

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Litvinova N. M. 1998 — Two new species of the genus *Ophiuraster* (Ophiurinae, Ophiuroidea, Echinodermata) from French collections and some remarks on the genus. *Zoosystema* 20 (3) : 439-444.

ABSTRACT

Two new species of the poorly known genus *Ophiuraster* (Ophiurinae, Ophiuroidea, Echinodermata), *O. belyaevi* n.sp. from Kerguelen Islands and *O. patersoni* n.sp. from Bay of Biscay are described on the basis of the collection of the Muséum national d'Histoire naturelle, Paris. The genus is characterized by a combination of plesiomorphic and apomorphic features. The distribution of these species is shown on a map.

RÉSUMÉ

Deux nouvelles espèces du genre *Ophiuraster* (Ophiurinae, Ophiuroidea, Echinodermata) de la collection du Muséum national d'Histoire naturelle, Paris et quelques remarques à propos du genre. Deux espèces nouvelles du genre *Ophiuraster* (Ophiurinae, Ophiuroidea, Echinodermata) sont décrites à partir des collections du Muséum national d'Histoire naturelle, Paris : *O. belyaevi* n.sp. des îles Kerguelen et *O. patersoni* n.sp. du golfe de Gascogne. Le genre est caractérisé par la combinaison de caractères plésiomorphes et apomorphes. La carte de la répartition de ce genre, très peu connu, est donnée.

KEY WORDS

Ophiuroidea,
Ophiurinae,
Ophiuraster,
O. belyaevi n.sp.,
O. patersoni n.sp.,
systematics.

MOTS CLÉS

Ophiuroidea,
Ophiurinae,
Ophiuraster,
O. belyaevi n.sp.,
O. patersoni n.sp.,
systématique.

INTRODUCTION

The genus *Ophiuraster* was established by H. L. Clark (1939). It includes very small brittle stars, having disks that are poorly differentiated from the short and wide arms. Large, closely connected plates border the dorsal and ventral margins of the disk. As a result the brittle stars of this genus resemble some sea stars of the Family Goniasteridae. Only two species of this genus have previously been described each represented by only one specimen. I found two undescribed species of this genus in the collection of the Laboratoire de Biologie des Invertébrés marins et Malacologie of the Muséum national d'Histoire naturelle, Paris. The unusual characters of these species broaden our understanding of this genus. The genus *Ophiuraster* includes now four species: *O. perissus* Clark, 1939; *O. symmetricus* Fell, 1958; *O. belyaevi* n.sp.; *O. patersoni* n.sp. The map of distribution of the genus is given (Fig. 1).

Order OPHIURIDAE
Suborder CHILOPHIURINA
Family OPHIURIDAE
Subfamily OPHIURINAE

Ophiuraster belyaevi n.sp.
(Fig. 2)

HOLOTYPE. — One specimen, (MNHN EcOs 5839) collected off Kerguelen Islands, *Marion-Dufresne* MD-04 cruise, stn I-106, CP 258, 48°43'5"S - 71°06'5"E, 925 m, 13.III.1975.

ETYMOLOGY. — The species is named to honour my teacher, late Professor Georgy Michailovich Belyaev, a specialist of Echinodermatae.

DIFFERENTIAL DIAGNOSIS. — The new species is distinguished by the absence of dorsal-arm plates and arm spines, vertebrae covered by transparent skin, and a large terminal plate present at the tip of each arm. The new species is more closely related to *O. patersoni* described below than to *O. perissus* and *O. symmetricus*.

DESCRIPTION

The disk diameter is 3 mm, and the arms are short and wide, 2.5 mm in length with a basal

width of 1.3 mm. The center of the dorsal surface of the disk is elevated and covered by primary plates: the centrodorsal plate is divided into three small irregularly shaped plates, which are in contact with each other. The radial plates are large, quadrangular and irregularly shaped; one is divided into several pieces by radial fissures. A small interradial plate lies distal to each pair of radial plates. All plates have a porous surface and irregular edges.

The marginal part of the dorsal surface disk is depressed and covered with skin in which the radial shields are embedded. The radial shields are longer than broad and separated by a strip of integument. In each interradius, the edge of the disk is occupied by two quadrangular plates, which meet interradially. The same plates extend to the ventral surface of the disk. They are very large, quadrangular, closely connected and occupy the entire peripheries of the ventral interradius.

The arms appear to be shorter than diameter of the disk. They are wide at their base and connected tightly with the disk. There are no dorsal arm plates. There are six arm joints beyond the edge of the disk, each of which bears protruding lateral arm plates. The lateral plates of each segment are widely separated from each other by a strip of thin integument through which the vertebrae can be seen. The lateral plates of successive segments contact each other. There are no spines in the arms. The end of each arm is occupied by a large widened heart-shaped terminal plate. There are two very small pointed protrusions in the distal end of it that are rather hard to notice. The ventral arm plates are present only in four segments of the arm. The first ventral arm plate is large and rounded. Three distal ones are minute and deeply depressed. The ventral arm plates are widely separated from each other. The second oral tentacle pore opens outside the mouth, and tentacle pores are present throughout the length of the arm. They are small and covered with thin skin that has a central hole for the tentacles. There are neither tentacle scales nor oral shields. The distal part of adoral shield of one of interradius is elevated and bears a large water-pore. The adoral shields are large and irregularly quadrangular. The oral plates are large and have one to three ill-defined oral papillae, of which the apical

papillae are larger. In the depth of the mouth a tooth-like apical papilla can be seen. There is a minute bursal slit in one of interradius.

Ophiuraster patersoni n.sp.
(Fig. 3)

HOLOTYPE. — One specimen (MNHN EcOs4895) collected in Bay of Biscay, *Jean Charcot* BIOGAS VI, Stn 6, DS86, 44°05'N - 04°19'W, 1950 m.

ETYMOLOGY. — The species is named to honour Dr Gordon Paterson who originally identified this specimen up to genus.

DIFFERENTIAL DIAGNOSIS. — The new species closely resembles *O. belyaevi* n.sp., differing from it by the absence radial shields and adoral plates, by the small terminal plate, and in the presence of only primary plates on the disk. It is possible that the only specimen available is not adult and additional material could make the diagnosis more precise.

DESCRIPTION

Disk is flat, diameter 1.9 mm. Arms and disk are not well-differentiated and the animal at first sight resembles a sea-star. The dorsal surface of

the disk is covered with transparent skin and large, centrally situated, primary plates with a porous appearance. The centrodorsal plate is divided transversely in two unequal parts. The five radial plates are larger and irregularly rounded. There are no radial shields and the lateral plates of the first segments of arms take their place. Two large, closely connected marginal plates make contact interradially and extend to the ventral side of the disk.

The arms are short and consist of five segments. The arm length is 1.4 mm; the basal width 0.6 mm. There are no dorsal plates in the arms but only large and swollen lateral ones. The lateral plates of each segment are separated on dorsal side of arm by a strip of transparent integument through which the vertebrae are seen. The first pair of lateral plates is small and situated within a range of the disk close to its marginal plates. They could be easily mistaken for radial shields but there are the vertebrae, which can be seen through the skin. The distal lateral plates are larger and more swollen, meeting broadly above and below the arm.

The terminal plates are large; each bears two to

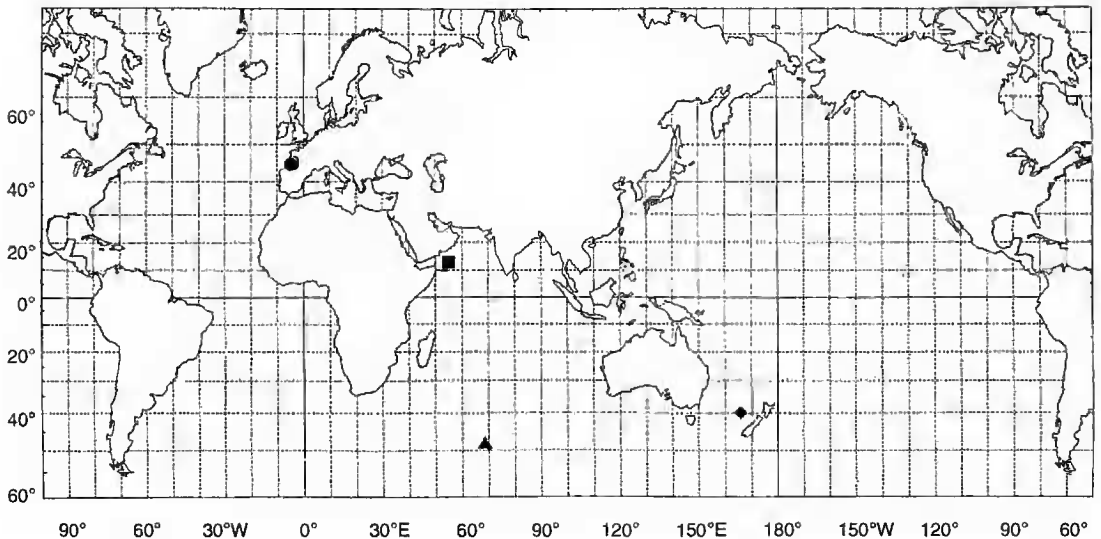
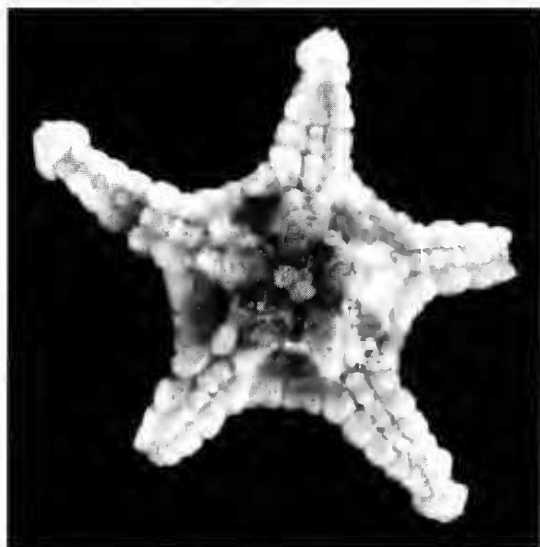


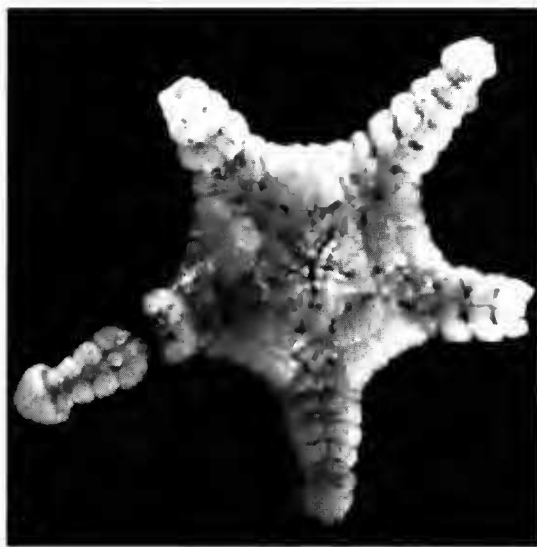
Fig. 1 — Distribution of the species of the genus *Ophiuraster*; ■, *O. perissus* (2312 m); ♦, *O. symmetricus* (720 m); ▲, *O. belyaevi* (925 m); ●, *O. patersoni* (1950 m).

four very small pointed protrusions in the distal end. There are no arm spines. The first ventral plate is large and rounded, the two distal ones are very small and deeply depressed. There are no oral shields or adoral shields. In the place of the oral plates, there are diamond-shaped patches of thin integument.

The long oral plates have small and ill-defined oral papillae. The apical papillae are largest and similar to the teeth situated above them. The second oral tentacle pore opens outside the mouth. The small tentacle pores are present on the full length of the arm. There are no tentacle scales. The ventral interradiar side of the disk is



A



B

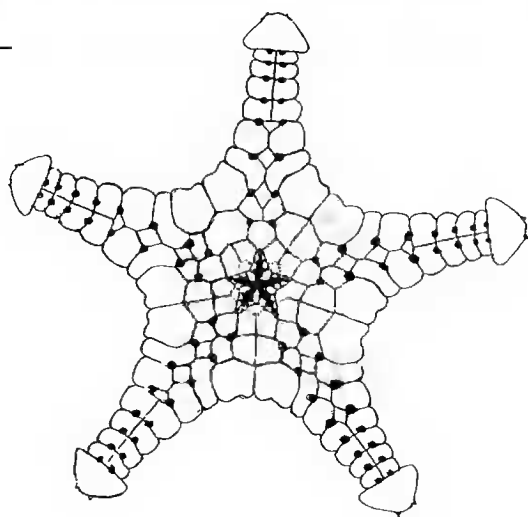
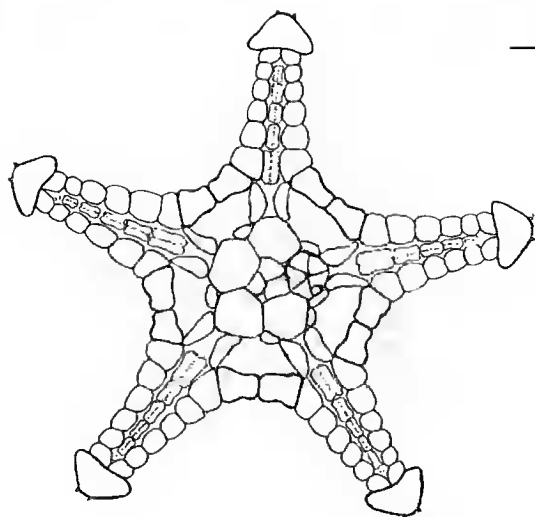


FIG. 2. — *Ophiuraster belyaevi* n.sp., disk diameter: 3 mm; A, dorsal surface of disk; B, ventral surface of disk. Scale bar: 1.0 mm.

occupied by two large marginal plates, which meet interradially. No genital plates and bursal slits were evident.

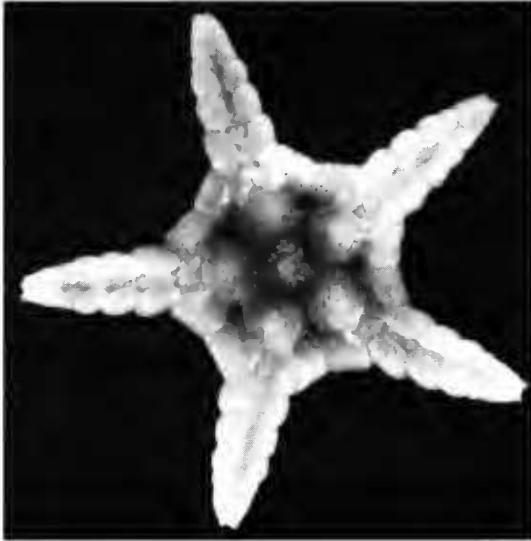
REMARKS

A well-preserved crustacea, occupying the whole stomach, is seen through the semi-open mouth.

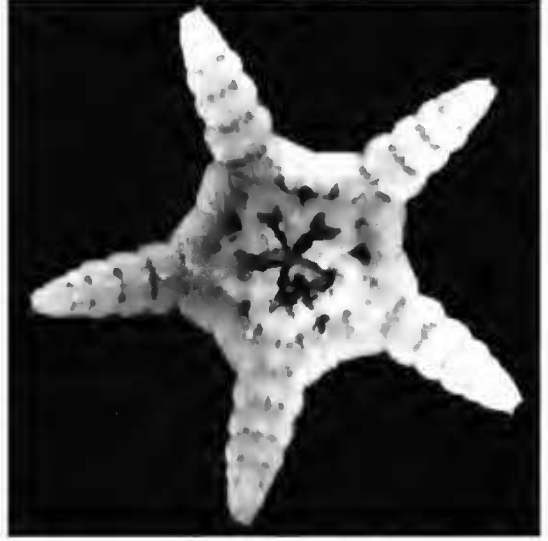
But, because there only was one specimen of this species, it was not possible to extract and identify this animal.

DISCUSSION

There are some contradictions in the interpretation by different authors of some morphological



A



B

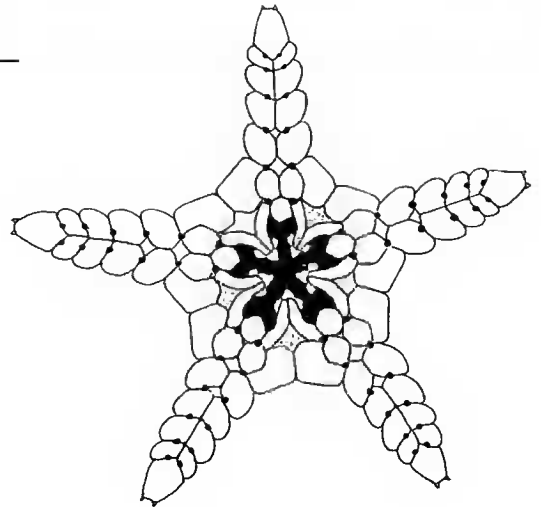
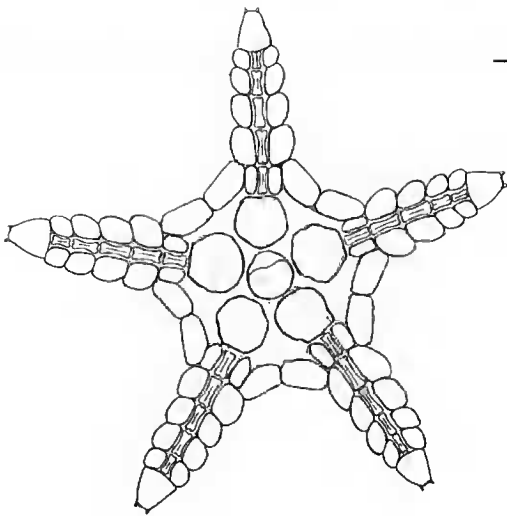


FIG. 3. — *Ophiuraster patersoni* n.sp., disk diameter: 1.9 mm; A, dorsal surface of disk; B, ventral surface of disk. Scale bar: 1.0 mm.

features of species of this genus. In *O. perissus*, Clark (1939) considered the large marginal plates occupying the whole margin of the disk to be radial shields. Fell (1958) supposed that these plates in *O. symmetricus* were the broadened lateral arm plates. On the basis of these two new species both described from only one specimen, I propose that the plates occupying dorsal and ventral interrarial surface are considered as marginal interrarial plates of the disk.

H. L. Clark (1939) had noticed that the genus *Ophiuraster* is probably closely related to the genus *Ophiomastus*; Matsumoto (1917) and Vadon (1991) considered that genera similar to *Ophiomastus* are paedomorphic. The species of the genus display a combination, of both paedomorphic and specialized characters. On the one hand the new species have some characters that are typical for juvenile ophiuroids: (1) the arms are extremely short and consist of few segments; (2) the arm spines are absent; (3) the oral shields and adoral plates (*O. patersoni*) and tentacle scales are also absent; (4) the structure of oral papillae is primitive; (5) the genital cleft is not noticeable; (6) the body size is small.

On the other hand, the new species have characters that constitute a specialization among Ophiurinae: (1) the presence of skin covered patches on the disk and arms; (2) the presence of a large terminal plate; (3) the wide separation between the lateral plates of each arm segment on the dorsal side; (4) the absence of dorsal plates on the arms; (5) the presence of thin skin in the place of the dorsal plates through which the vertebrae can be seen; (6) the presence of widened cap-like terminal plate resembling those plates that were found in *Ophiambix meteoris* Bartsh, 1983, a representative of an extremely specialized genus. The absence of dorsal plates and their replacement by the skin are interpreted as a resorption of the plates (Hotchkiss 1993).

On the basis of their plesiomorphic and apomorphic characteristics the *Ophiuraster* species have clear affinities to the Ophiurinae such as *Ophiambix*, *Astrophium* and *Ophiophycis*, which superficially resemble sea-stars. But this similarity with asteroids has been reached by different ways in different genera.

Acknowledgements

I would like to thank the members of the MD-04 and BIOGAS IV expeditions, especially Alain Guille and Lucien Laubier, who collected this material. I am very grateful to Nadia Ameziane, Alain Crosnier, Bernard Métyvier, Danièle Dondon for their friendliness, help and for giving me an opportunity to work in the Muséum national d'Histoire naturelle, Paris and to Kir Nesis for reading and commenting on draft of this manuscript.

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Submitted on 26 May 1997;
accepted on 8 December 1997.